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CHILDREN'S PREFERENCE FOR STIMULI ASSOCIATED WITH BEING IMITATED[1]

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Forty-eight preschool children were run under a classical conditioning paradigm in which some neutral stimuli were repeatedly associated with an adult matching the behavior of the subject, and other neutral stimuli were associated with the same adult mismatching the behavior of the subject. Preference for the stimuli associated with being matched increased over the course of the experiment, the overall preference for the matched stimuli exceeded chance, and there was no evidence that the subjects imitated the immediately prior performance of the adult. The overall results are consistent with the thesis that behavioral similarity serves a reinforcing function and that behavioral dissimilarity serves a more transitory punishing function.

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[1]This research is based on an M.A. thesis submitted to the University of Iowa by the junior author. Address for reprint requests: David A. Parton, Department of Sociology, University of Iowa, Iowa City, Iowa 52242. The research reported in this paper was presented at the 1973 biennial meeting of the Society for Research in Child Development, Philadelphia, Pa.

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Explanations of the acquisition and performance of nonreinforced imitation have frequently focused on the observer's response being similar to the modeled behavior (Thorndike, 1911, p. 253; Mowrer, 1960, pp. 70-116; Baer & Sherman, 1964, p. 47; Staats, 1968, p. 444) or dissimilar to the modeled behavior (Miller & Dollard, 1941, p. 157). Behavioral similarity is a relational stimulus, i.e., a compound stimulus composed of the response of the model and the matching response of the observer. Behavioral similarity is defined, therefore, without reference to any covert response (perception or cognition) on the part of the observer, just as the relational stimulus of "larger than" is defined in discrimination learning experiments.

Imitation theorists (cited above) have suggested that the extrinsic reinforcement of imitation endows the relational stimulus of similarity with a conditioned reinforcing function. This thesis has been recently criticized with the argument that if behavioral similarity is reinforcing, then people should display widespread reproduction of all types of behavior exhibited by different models (Bandura, 1971, p. 126; Bandura & Barab, 1971; McLaughlin, 1971, p. 163). This position is analogous to arguing, given a starved rat with a history of receiving electric shock when he ate in the presence of a red light, that the rat's current failure to eat in the presence of a red light indicates that food is not a reinforcing stimulus for that animal. Such a conclusion fails to acknowledge the

interaction of discriminative and reinforcing stimuli in the control of behavior. Recent imitation studies, conducted within the generalized imitation research paradigm, indicate the importance of both discriminative and reinforcing stimuli in determining imitation (Bandura & Barab, 1971; Peterson, Merwin & Moyer, 1971; Steinman, 1970). These investigations indicate that imitative performance in that research paradigm is predominantly a function of discriminative stimuli, and, hence, the paradigm is hardly optimal for investigating the role of behavioral similarity in the imitation process. Furthermore, the investigation of behavioral similarity within any imitation paradigm is handicapped by similarity being inextricably tied to the occurrence of a matching response by the subject. Such a problem does not exist for behavioral similarity which occurs when a subject's response is matched by another person, and, therefore, this experiment examines the function of similarity arising from being matched.

If behavioral similarity serves a reinforcing function, then the pairing of a neutral stimulus with similarity should result in the neutral stimulus acquiring a reinforcing function. Hence, this experiment involved a classical conditioning paradigm in which some neutral stimuli were repeatedly associated with an adult matching the behavior of the subject, and other neutral stimuli were repeatedly associated with the same adult mismatching the behavior of the subject. Dispersed throughout this training were probe trials during which the child had to choose a single stimulus from the two sets of stimuli. The measure of reinforcer efficacy was simply the subject's stimulus preference, and, therefore, the paradigm was analogous to that used by Nunnally, Knott, and Duchnowski (1967) for studying the conditioning of preferences in young children.

Method

Subjects and Adult Players

The subjects were 24 girls and 24 boys from a university preschool; their mean age was 62 months. The adult players were eight preschool teachers. Past research on the effects of nurturance on imitation allows the suggestion that a maximum experimental effect would occur if the person who matched and mismatched the child was someone the child liked and to whom the child had learned to attend. Consequently, before the experimental session each child identified his, or her, favorite female preschool teacher, and that teacher received training in the adult player role prior to the experimental session with the nominating child.

Apparatus

A runway (a 20 cm. x 2.5 meter board standing 60 cm. from the floor) and table were arranged in a "T" configuration with the runway serving as the leg of a "T". Approximately one meter beyond the bottom of the "T" were two identical gray boxes on a stand. The table was divided lengthwise by a 30 cm. high board. On the runway side of the divider was a can to receive tokens and four colored wooden blocks (19 mm. x 6.5 cm. x 6.5 cm.): red, green, blue, and yellow. Behind the divider were additional blocks of each color and a container of white plastic tokens.

Procedure

On the first training trial the experimenter (an adult female) placed a token on top of the block that the child was required to manipulate on that trial. The child was told to pick up the block and token, place the token in the can (for a future prize), push the block down the runway, wait at the end of the runway until the adult had selected a block and moved it down the runway, and finally place the block in one of the two

boxes. This sequence of behaviors allowed the adult player to systematically match or mismatch three aspects of the child's behavior. First, the adult player could manipulate the color of the block used by the child, or a different color. Second, the child could move the block down the runway on edge or lying flat, and, hence, the adult could match or mismatch the orientation of the block. Third, the adult could place his block in the same box as the child or in the other box (the adult player removed both blocks from the boxes at the end of each trial). Whether the adult matched or mismatched the child in these three ways depended on the color of the block the child used on that trial. For each child two colors were assigned to be matched and the remaining two colors were mismatch stimuli. On those trials on which the child manipulated a mismatch stimulus, the adult used the mismatch color that the child did not use.

The 24 training trials were divided into six blocks of four trials, and within each block of trials the subject manipulated a different color on each trial. Following each block of training trials a probe trial was introduced. Prior to each probe trial the adult player left the room and the experimenter told the subject, "While Ms. (name) is gone, you may choose any block that you want, slide it down the board and place it in one of the boxes." The experimenter avoided eye contact with the subject during the probe trial. On the probe trial none of the blocks contained a token, and, therefore, the subject had to choose one of the four colors.

Design

As indicated above, the main experimental manipulation was the within-subject manipulation of Match vs Mismatch stimuli. In order to counterbalance the color of blocks assigned to the Match and Mismatch stimulus classes, an equal number of subjects were assigned to each of

the six possible color combinations, thereby providing a Color Counterbalance factor. Sex of Subject constituted a second between-subject factor, and the six probe trials were divided into three blocks of two trials to provide a Trial Blocks factor.

The third between-subjects factor was dictated by the following considerations. The adult's performance (match or mismatch) on the fourth trial of each training block immediately preceded the subject's choice of blocks on the probe trial, and, therefore, the subject might imitate the adult's prior color choice. This possibility requires that the adult's performance on trial four of each training block involve mismatch stimuli as often as match stimuli. Thus, each subject was exposed to adult matching prior to three probe trials and mismatching prior to three probe trials; this procedure constituted the within-subject factor of Prior Match Trials vs Prior Mismatch Trials. Half of the subjects were assigned to a Sequence Counterbalance condition in which adult matching occurred prior to the odd numbered probe trials (and mismatching prior to even numbered probe trials). For the remaining subjects, matching by the adult occurred prior to the even numbered probe trials. Since each subject was matched by the adult prior to three probe trials, one match color was used on one trial and the other color on two trials. The assignment of the two match (or mismatch) colors to the trials preceding probes was counterbalanced but not analyzed.

Results and Discussion

The primary data analysis involved a mixed factorial analysis of variance in which the dependent variable was dichotomous. A score of one denoted the choice of a match stimulus on a probe trial and zero denoted

the choice of a mismatch stimulus. No significant main effects were found for Sex of Subject, Color Counterbalance, nor Sequence Counterbalance; and there were no significant interaction effects. The analysis indicated two significant main effects, and these effects are represented in Figure 1.

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Insert Figure 1 about here
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First, a significant main effect of Trial Blocks was obtained, $\underline{F}(2,88) = 8.46$, $\underline{p} < .001$. This effect was due to the match stimuli being chosen more frequently during the last third of the experiment than during either the first third, $\underline{F}(1,44) = 5.05$, $\underline{p} < .05$, or the middle third, $\underline{F}(1,44) = 13.95$, $\underline{p} < .001$. This increase in the choice of match stimuli at the end of the experiment is consistent with a conditioning explanation. At the beginning of training, differential preference should be low due to the match stimuli having few pairings with similarity, and later in training the additional pairings should increase the differential preference. Over the total experiment, match stimuli were chosen 61 percent of the time, which was significantly greater than chance, $\underline{t}(47) = 3.355$, $\underline{p} < .002$.

The second main effect involved match stimuli being chosen more frequently given that the adult had matched the subject on the previous trial than given that the adult mismatched the subject, $\underline{F}(1,44) = 7.52$, $\underline{p} < .01$. This outcome could have been due to two factors. First, assume that the pairing of a stimulus with similarity has an influence on stimulus preference which decays over time. Given this assumption, match stimuli should be preferred less under the prior mismatch condition because there was a greater temporal delay between the probe trial and the last prior matching trial under the prior mismatch condition than under the prior match condition. Second, if the subject were to imitate the prior choice of the

model, then a match stimulus would be chosen following the adult using a match stimulus and a mismatch stimulus would be chosen following the adult using a mismatch stimulus.

Further analyses were performed to determine whether the experimental outcomes could be attributed to imitation on the part of the subjects. First, the data were examined to see whether the subject imitated on those probe trials which followed the adult matching the subject. On 55 occasions the subjects chose the identical match stimulus used by the adult on the prior trial while the nonidentical match stimulus was chosen 43 times. These two frequencies cannot be directly contrasted with a statistical test because a subject could contribute more than one choice to each category set. For each subject, therefore, the number of choices of the nonidentical match stimulus was subtracted from the number of choices of the identical match stimulus, and the resulting difference scores (mean = .25) were compared with the chance mean of zero, $t(47) = 1.193$, n.s. The data fail to support the view that the subjects imitated the adult on those trials preceded by the adult matching the subject. A comparable analysis was performed to determine whether subjects choose the identical mismatch stimulus more than the nonidentical mismatch stimulus on those probe trials preceded by the adult mismatching the subject. The individual difference scores (mean = -.42) were compared with the chance mean of zero, $t(47) = 2.611$, $p < .02$. This outcome counterindicates direct imitation because the choice of nonidentical stimuli was greater than the choice of identical stimuli. This result is compatible with the thesis of Miller and Dollard (1941) that dissimilarity acquires the function of a punisher. It remains necessary, however, to explain why the choice of the nonidentical mismatch stimulus was not lower than the

choice of either of the two match stimuli (frequency of 44 vs 36 and 42); frequency of the nonidentical mismatch stimulus should have been lower due to previous associations with dissimilarity. One explanation is that the punishing effect of dissimilarity is transitory, and, therefore, dissimilarity influenced choice performance only on the immediately subsequent probe trial. Such an explanation still fails to explain other aspects of the data. It provides no account of the Trial Blocks effect which indicates an accumulative effect of training over the course of the experiment. Second, the explanation cannot account for preference for match stimuli on those probe trials following matching by the model. These latter two aspects of the results suggest that similarity served a reinforcing function. The results, in total, can be explained by positing that similarity served a reinforcing function and that dissimilarity served a more transitory punishing function.

The results do not seem consistent with an explanation which suggests that the subjects adopted a cognitive strategy to match the adult following matching by the adult and to mismatch the adult following mismatching by the adult. First, the results failed to indicate any direct imitation on the part of the subjects. Second, if the subjects were sufficiently sophisticated to adopt a strategy of mismatching the performance of the adult on prior mismatch probe trials, then they should have implemented the conceptually simpler strategy of direct matching following matching by the adult.

The conclusion that behavioral similarity (dissimilarity) serves a reinforcing (punishing) function has implications for explanations of nonreinforced imitation. This experiment comprised a test of one implication of the similarity explanation of nonreinforced imitation,

and the outcome supports that explanation. While the objection can be raised that similarity arising from being matched may have functional properties different from those of similarity arising from matching another person's behavior, it is not clear that there are any sound grounds for expecting such differences. The findings of this experiment support the view that one of the factors which contributes to the maintenance of imitative performances in the absence of traditional extrinsic reinforcement is the relational stimulus of behavioral similarity.

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FOOTNOTE

[1]This research is based on an M.A. thesis submitted to the University of Iowa by the junior author. Address for reprint requests: David A. Parton, Department of Sociology, University of Iowa, Iowa City, Iowa 52242.

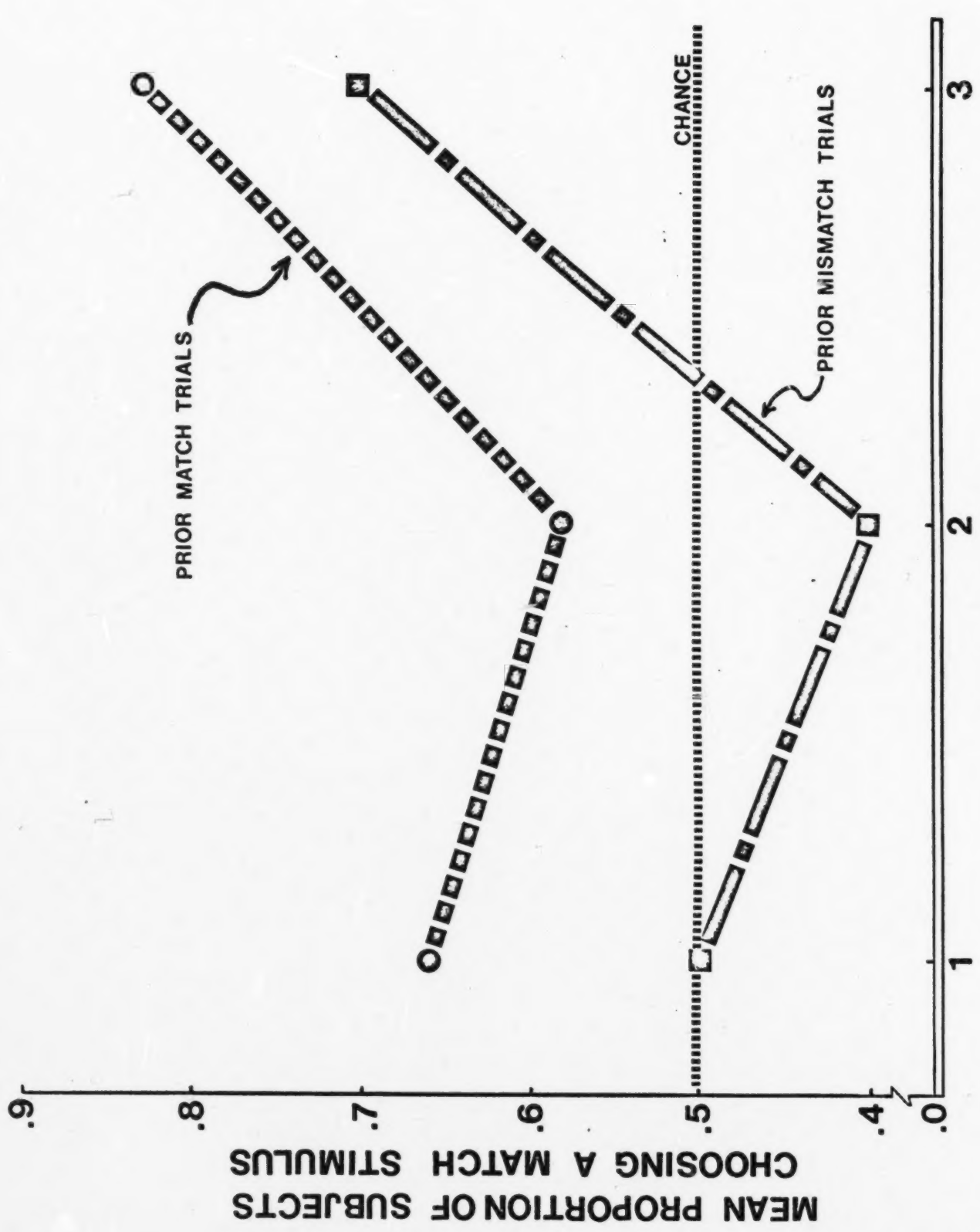

Figure 1. Preference for match stimuli across trial blocks according to whether the subject was matched or mismatched on the preceding training trial.